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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/603,041

06/24/2003

Steven Alan Lytle

Lytle 22-15-20

2383

7590

03/18/2005

Docket Administrator Agere Systems Inc.
Room 4u533C
4 Connell Drive
Berkeley Heights, NJ 07922-2747

EXAMINER

GHYKA, ALEXANDER G

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/603,041

Applicant(s)

LYTLE ET AL.

Examiner

Alexander G. Ghyska

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

ALEXANDER GHYKA
PRIMARY EXAMINER

AV 2812
Alex Ghyska

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claims 15-23 have been cancelled. Claims 1-14 are now under consideration.

Claim Objections

Claims 1-14 are objected to because of the following informalities: the presence of parentheses denoting numerals referring to the Figures throughout the Claims. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-9 and 12-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian (US 6,060,380).

The present claims generally call for a process for manufacturing an integrated circuit comprising providing a substrate comprising a dielectric layer over a conductive material; depositing a hardmask; applying a first photoresist over the hardmask and photodefining at least one first elongated opening; etching the hardmask and partially

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etching the dielectric to deepen the at least one first elongated opening to form a trench, the trench having a bottom in the dielectric layer; removing the first photoresist; applying a second photoresist and photodefining at least one second elongated opening across the trench and etching the exposed dielectric from the bottom of the at least one trench down to the underlying conductive material.

Subramanian et al disclose a process for manufacturing an integrated circuit comprising providing a substrate comprising a dielectric layer over a conductive material; depositing a hardmask; applying a first photoresist over the hardmask and photodefining at least one first elongated opening; etching the hardmask and partially etching the dielectric to deepen the at least one first elongated opening to form a trench, the trench having a bottom in the dielectric layer; removing the first photoresist; applying a second photoresist and photodefining at least one second elongated opening across the trench and etching the exposed dielectric from the bottom of the at least one trench down to the underlying conductive material, as required in present Claims 1-3 and 13-14. See column 5, line 25 to column 6, line 15, Moreover, Subramanian disclose that the hardmask can be silicon nitride. See column 4, lines 65-68. Subramanian also disclose metallization and planarization. See column 6, lines 8-20. Furthermore, Subramanian disclose a square cross section as required in Claims 8 and 9. See Figure 2. Therefore, Subramanian et al anticipate the afore mentioned Claims.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian et al (US 6,060,380) in view of Yang et al (US 6,162,587).

Subramanian et al is relied upon as discussed above.

However, Subramanian et al does not disclose a connection having a rectangular cross section having a feature size of 0.5 microns or less.

Yang et al disclose (col. 5, line 50 – col. 6, line 5) an integrated circuit comprising at least one connection, the connection having a quadrilateral cross section and a feature size of 0.5 microns or less.

It would have been obvious for one of ordinary skill in the art, at the time of the invention, to form a rectangular cross section having a feature size of 0.5 microns or less using the process of Subramanian, as Yang et al disclose the equivalence of square and rectangular connects, and the fact that connects of 0.5 microns or less are known in the art. In light of the disclosure of Yang et al that both square and rectangular connects are known in the art it would have been obvious for one of ordinary skill in the art to use the process of Subramanian et al to produce a rectangular connect, for its known benefit in the art as a connect. Moreover, as Yang et al disclose the formation of connects of 0.5 microns or less, the formation of such a connect with the process of Subramanian would simply be a matter of optimization. Therefore, a *prima facie* case of obviousness is established.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571)

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272-1669. The examiner can normally be reached on Monday through Thursday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AGG
March 14, 2005

ALEXANDER GHYKA
PRIMARY EXAMINER

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Alex Ghyska